

SEQUENCE LISTING

<110> Hannapel, David J.
Chen, Hao
Rosin, Faye M.

<120> POTATO TRANSCRIPTION FACTORS, METHODS OF USE THEREOF,
AND A METHOD FOR ENHANCING TUBER DEVELOPMENT

<130> 82162/171

<140>
<141>

<150> 60/397,423
<151> 2002-07-19

<160> 28

<170> PatentIn Ver. 2.1

<210> 1
<211> 2735
<212> DNA
<213> Solanum tuberosum

<400> 1
catgcagaga taaaaatata gatcagtctg acaagaaggc aacttctcaa agcttagaga 60
gctaccaccc gaagatagac agttagttac atgtactgtt atagataaaa ggagaaatcc 120
gaagaagaaa gaatttttt tgcatatgt tactatcaag gaacctcgga taataactaat 180
atacaagctg atcatcaaca acgtcataat catggaaata gtaataataa taatattcag 240
acactttatt tcatgtacccc taacaattat atgcaaggct acactacttc tgacacacag 300
cagcagcagc agttactttt cctgaattct tcaccagcag caagcaacgc gctttgcac 360
gcgaatatac aacacgcgc aacacgcgc gctgcaacag cagcactttg tcggtgtgcc tcttccggca 420
gtaaatttgc acgtatcatat caatcatat ggacttttac agcgcattgtg gaacaaccaa 480
gatcaatctc agcagggtat agtaccatcg tcgacggggg tttctgccac gtcatgtggc 540
gggatcacca cggacttggc gtctcaattt gctttcaga ggccgattcc gacaccacaa 600
caccgcacgc agcaacaaca gcaaggcggt ctatctctaa gccttctcc tcagctacaa 660
cagcaaatta gttcaataa caatattca tcctcatcac caaggacaaa taatgttact 720
attagggaa cattagatgg aagttctagc aacatggtt taggctctaa gtatctgaaa 780
gctgcacaag agttcttgc tgaagtgtt aatattgtt gaaaaagcat caaaggagat 840
gatcaaaaga aggataattc aatgaataaa gaatcaatgc ctttggctag tgatgtcaac 900
actaatagtt ctgggtgg tgaaagttagc agcaggcaga aaaatgaagt tgctgttgc 960
cttacaactg ctcaaagaca agaacttcaa atgaaaaaaag ccaagttct tgccatgctt 1020
gaagagggtgg agcaaaggta cagacagtac catcaccaaa tgcaaataat tgtattatca 1080
tttgagcaag tagcaggaat tggatcagcc aaatcataca ctcaattagc tttgcattgca 1140
atttcgaagc aattcagatg cctaaaggat gcaattgctg agcaagtaaa ggccgacgagc 1200
aagagtttag gtgaagagga aggcttggga gggaaaatcg aaggctcaag actcaaattt 1260

gtggaccatc atctaaggca acaacgcgcg ctgcaacaga taggaatgat gcaaccaa 1320
 gcttggagac cccaaagagg tttacctgaa agagctgtct ctgtcctcg tgcttggctt 1380
 ttcgagcatt ttcttcattcc ttacccaaag gattcagaca aaatcatgct tgctaagcaa 1440
 acggggctaa caaggagcca ggtgtctaac tgttcataaa atgctcgagt tcgattatgg 1500
 aagccaatgg tagaagaat gtacttgaa gaagtgaaga atcaagaaca aaacagtact 1560
 aatacttcag gagataacaa aaacaaagag accaatataa gtgctccaaa tgaagagaaa 1620
 catccaatta ttacttagcag cttattacaa gatggtatta ctactactca agcagaaaatt 1680
 tctacctcaa ctattncaac ttccccact gcaggtgctt cacttcatca tgctcacaat 1740
 ttctccttcc ttgggtcatt caacatggat aatactacta ctactgttga tcataattgaa 1800
 aacaacgcga aaaagcaaag aaatgacatg cacaagtttt ctccaagtag tattcttca 1860
 tctgttgaca tggaagccaa agctagagaa tcatcaaata aagggttac taatccttta 1920
 atggcagcat acgcgatggg agattttgga aggtttgatc ctcatgatca acaaattgacc 1980
 gcgaattttc atgaaataa tgggtgtctt ctacttttag gacttcctcc ttctgaaaac 2040
 cttagccatgc cagtgagcca acaaaattac ctttctaattg acttggaaag taggtctgaa 2100
 atggggagtc attacaatag aatggatata gaaaacattt gatggatggatggataaag 2160
 cgatttccga ctcaactatt accagatttt gttacaggta atctaggaac atgaataacca 2220
 gaaagtctcg tattgatagc tgaaaagata aaaggaaatgggacttggatggatggatgg 2280
 tgaggcccttc tggcccaagt cggaggaccc aatttgcatac aacctatcat aggagaaaaag 2340
 aagtggagac taaattaaag taacaaattt ttaaagcaca ctttctagta tatataacttc 2400
 tttttttat agtataaaaa agaagagatt ttgtgcttta gtgtatagat agagtctact 2460
 tagtataatgttataacttcta gttccttgag aagattgata caacttagtag tattttttt 2520
 ctttgggtt ggcttggagt actattttaa gttattggaa actagctata gtaaatgtt 2580
 taaagttgtg atattgttcc tctcaatttgcataattt gaaatattt gtacctacta 2640
 gcttagtctct aaattatgtt tccattgctt gtaattgcaa ttttatttga attttgtgct 2700
 atcattatta gattagcaaa aaaaaaaaaa aaaaaa 2735

<210> 2
 <211> 688
 <212> PRT
 <213> Solanum tuberosum

<400> 2

Met	Tyr	Tyr	Gln	Gly	Thr	Ser	Asp	Asn	Thr	Asn	Ile	Gln	Ala	Asp	His
1															15

Gln	Gln	Arg	His	Asn	His	Gly	Asn	Ser	Asn	Asn	Asn	Ile	Gln	Thr
														30

Leu	Tyr	Leu	Met	Asn	Pro	Asn	Asn	Tyr	Met	Gln	Gly	Tyr	Thr	Thr	Ser
															45

Asp	Thr	Gln	Gln	Gln	Gln	Leu	Leu	Phe	Leu	Asn	Ser	Ser	Pro	Ala

Ala	Ser	Asn	Ala	Leu	Cys	His	Ala	Asn	Ile	Gln	His	Ala	Pro	Leu	Gln
															80

Gln	Gln	His	Phe	Val	Gly	Val	Pro	Leu	Pro	Ala	Val	Ser	Leu	His	Asp
														95	
85															
Gln	Ile	Asn	His	His	Gly	Leu	Leu	Gln	Arg	Met	Trp	Asn	Asn	Gln	Asp
														110	
100															
Gln	Ser	Gln	Gln	Val	Ile	Val	Pro	Ser	Ser	Thr	Gly	Val	Ser	Ala	Thr
														125	
115															
Ser	Cys	Gly	Gly	Ile	Thr	Thr	Asp	Leu	Ala	Ser	Gln	Leu	Ala	Phe	Gln
														140	
130															
Arg	Pro	Ile	Pro	Thr	Pro	Gln	His	Arg	Gln	Gln	Gln	Gln	Gln	Gly	
														160	
145															
Gly	Leu	Ser	Leu	Ser	Leu	Ser	Pro	Gln	Leu	Gln	Gln	Gln	Ile	Ser	Phe
														175	
165															
Asn	Asn	Asn	Ile	Ser	Ser	Ser	Pro	Arg	Thr	Asn	Asn	Val	Thr	Ile	
														190	
180															
Arg	Gly	Thr	Leu	Asp	Gly	Ser	Ser	Ser	Asn	Met	Val	Leu	Gly	Ser	Lys
														205	
195															
Tyr	Leu	Lys	Ala	Ala	Gln	Glu	Leu	Leu	Asp	Glu	Val	Val	Asn	Ile	Val
														220	
210															
Gly	Lys	Ser	Ile	Lys	Gly	Asp	Asp	Gln	Lys	Lys	Asp	Asn	Ser	Met	Asn
														240	
225															
Lys	Glu	Ser	Met	Pro	Leu	Ala	Ser	Asp	Val	Asn	Thr	Asn	Ser	Ser	Gly
														255	
245															
Gly	Gly	Glu	Ser	Ser	Ser	Arg	Gln	Lys	Asn	Glu	Val	Ala	Val	Glu	Leu
														260	
260															
265															
270															
Thr	Thr	Ala	Gln	Arg	Gln	Glu	Leu	Gln	Met	Lys	Lys	Ala	Lys	Leu	Leu
														275	
275															
Ala	Met	Leu	Glu	Glu	Val	Glu	Gln	Arg	Tyr	Arg	Gln	Tyr	His	His	Gln
														290	
290															
295															
Met	Gln	Ile	Ile	Val	Leu	Ser	Phe	Glu	Gln	Val	Ala	Gly	Ile	Gly	Ser
														305	
310															
315															
Ala	Lys	Ser	Tyr	Thr	Gln	Leu	Ala	Leu	His	Ala	Ile	Ser	Lys	Gln	Phe
														325	
330															
335															

Arg Cys Leu Lys Asp Ala Ile Ala Glu Gln Val Lys Ala Thr Ser Lys
340 345 350

Ser Leu Gly Glu Glu Gly Leu Gly Gly Lys Ile Glu Gly Ser Arg
355 360 365

Leu Lys Phe Val Asp His His Leu Arg Gln Gln Arg Ala Leu Gln Gln
370 375 380

Ile Gly Met Met Gln Pro Asn Ala Trp Arg Pro Gln Arg Gly Leu Pro
385 390 395 400

Glu Arg Ala Val Ser Val Leu Arg Ala Trp Leu Phe Glu His Phe Leu
405 410 415

His Pro Tyr Pro Lys Asp Ser Asp Lys Ile Met Leu Ala Lys Gln Thr
420 425 430

Gly Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val
435 440 445

Arg Leu Trp Lys Pro Met Val Glu Glu Met Tyr Leu Glu Glu Val Lys
450 455 460

Asn Gln Glu Gln Asn Ser Thr Asn Thr Ser Gly Asp Asn Lys Asn Lys
465 470 475 480

Glu Thr Asn Ile Ser Ala Pro Asn Glu Glu Lys His Pro Ile Ile Thr
485 490 495

Ser Ser Leu Leu Gln Asp Gly Ile Thr Thr Thr Gln Ala Glu Ile Ser
500 505 510

Thr Ser Thr Ile Ser Thr Ser Pro Thr Ala Gly Ala Ser Leu His His
515 520 525

Ala His Asn Phe Ser Phe Leu Gly Ser Phe Asn Met Asp Asn Thr Thr
530 535 540

Thr Thr Val Asp His Ile Glu Asn Asn Ala Lys Lys Gln Arg Asn Asp
545 550 555 560

Met His Lys Phe Ser Pro Ser Ser Ile Leu Ser Ser Val Asp Met Glu
565 570 575

Ala Lys Ala Arg Glu Ser Ser Asn Lys Gly Phe Thr Asn Pro Leu Met
580 585 590

Ala Ala Tyr Ala Met Gly Asp Phe Gly Arg Phe Asp Pro His Asp Gln
595 600 605

Gln Met Thr Ala Asn Phe His Gly Asn Asn Gly Val Ser Leu Thr Leu
610 615 620

Gly Leu Pro Pro Ser Glu Asn Leu Ala Met Pro Val Ser Gln Gln Asn
625 630 635 640

Tyr Leu Ser Asn Asp Leu Gly Ser Arg Ser Glu Met Gly Ser His Tyr
645 650 655

Asn Arg Met Gly Tyr Glu Asn Ile Asp Phe Gln Ser Gly Asn Lys Arg
660 665 670

Phe Pro Thr Gln Leu Leu Pro Asp Phe Val Thr Gly Asn Leu Gly Thr
675 680 685

<210> 3

<211> 1898

<212> DNA

<213> Solanum tuberosum

<400> 3

atgactttca ggtcttagtct tccactagac ctccgtgaaa tttcaacaac aaatcatcaa 60
gttggaaatac tattcatcatc accattacca tcaccaggaa caaataccaa taatatcaat 120
catactcgag gat taggggc atcatcatct ttttcgattt ctaatggat gatattgggt 180
tctaagtacc taaaagtgc acaagatctt cttgatgaag ttgttaatgt tggaaaaaaac 240
atcaaattat cagatggctt agagagtggt gcaaaggaga aacacaaatt ggacaatgaa 300
ttaatatctt tggcttagtga ttagtggaa agcagcagcc aaaaaatag tgggtttgaa 360
cttacaacag ctcaaagaca agaacttcaa atgaagaaag ccaagctgt tagcatgctt 420
gatgaggtgg atcaaaggta tagacaatac catcaccaaa tgcaaattgtat tgcaacatca 480
tttgagcaaa caacaggaat tggatcatca aaatcataca cacaacttgc tttgcacaca 540
atttcaaagc aatttagatg tttaaaagat gcaatttctg ggcaaataaa ggacactagc 600
aaaactttag gggaaagaaga aaacattgga ggc当地 aaggatcaaa gttgaaattt 660
gtggatcatc atttacgcca acaacgtgca ctacaacaat tagggatgtat gcaaaccaat 720
gcatggaaagc ctcaaagagg tttgccagaa agagcggtt cagttctccg cgcttggctt 780
ttcgagcatt ttcttcatcc gtatccaaa gattcagata aaatcatcct tgctaagcaa 840
acagggctaa caaggagcca ggtatcaa atggttataa atgcttagatg tagactatgg 900
aaggcaatgg tagaagaaat gtacatggaa gaagtgaaga aaaacaatca agaacaatgg 960
attgagccta ataacaatga aattgttggc tcaaaatcaa gtgttccaca agagaaatgg 1020
ccaatttagta gcaatattat tcataatgct tctccaaatg atatttctac ttccaccatt 1080
tcaacatctc cgacgggtgg cggcgggtcg attccgactc agacgggtgc aggtttctcc 1140
ttcatttagt cattaaacat ggagaacattt gatgtatcaaa ggaacaacaa aaaggcaaga 1200

aatgagatgc aaaattgttc aactagtact attctctcaa tggaaagaga aatcataaat 1260
aaagttgtgc aagatgagac aatcaaagt gaaaagttca acaacacaca aacaagagaa 1320
tgttactctc taatgactcc aaattacaca atggatgatc aatttggAAC aaggttcaat 1380
aatcaaattc atgaacaatt ggcaacaaca acaactttc atcaaggaaa tggcatgtt 1440
tctcttactt tagggcttcc accaaattct gaaaaccaac acaattacat tggattggaa 1500
aatcattaca atcaacctac acatcatcca aatattagct atgaaaacat tgatttcag 1560
agtggaaagc gatacgccac tcaacttata caagattttt tttcttgatg atatatataa 1620
tttgcaggta aatcagctt aattacatc atgacaggc ttgataaaaa gaaggggagt 1680
tgagatttag tgatcatata aatatgtata ggtagaaatt ttagtttagta tatatagggt 1740
atacttctag tttcttaatg aagataacaag ttttgttattt tttttgtat tgaggttaact 1800
agcttagctt gattattaa agttggtgca tgcaactaaa gaagaagaaa aaataatcta 1860
tatatgcaaa ctacagtata ttgtaaattt tgtgcttc 1898

<210> 4

<211> 535

<212> PRT

<213> Solanum tuberosum

<400> 4

Met Thr Phe Arg Ser Ser Leu Pro Leu Asp Leu Arg Glu Ile Ser Thr
1 5 10 15

Thr Asn His Gln Val Gly Ile Leu Ser Ser Ser Pro Leu Pro Ser Pro
20 25 30

Gly Thr Asn Thr Asn Asn Ile Asn His Thr Arg Gly Leu Gly Ala Ser
35 40 45

Ser Ser Phe Ser Ile Ser Asn Gly Met Ile Leu Gly Ser Lys Tyr Leu
50 55 60

Lys Val Ala Gln Asp Leu Leu Asp Glu Val Val Asn Val Gly Lys Asn
65 70 75 80

Ile Lys Leu Ser Asp Gly Leu Glu Ser Gly Ala Lys Glu Lys His Lys
85 90 95

Leu Asp Asn Glu Leu Ile Ser Leu Ala Ser Asp Asp Val Glu Ser Ser
100 105 110

Ser Gln Lys Asn Ser Gly Val Glu Leu Thr Thr Ala Gln Arg Gln Glu
115 120 125

Leu Gln Met Lys Lys Ala Lys Leu Val Ser Met Leu Asp Glu Val Asp
130 135 140

Gln Arg Tyr Arg Gln Tyr His His Gln Met Gln Met Ile Ala Thr Ser

145	150	155	160
Phe Glu Gln Thr Thr Gly Ile Gly Ser Ser Lys Ser Tyr Thr Gln Leu			
165	170	175	
Ala Leu His Thr Ile Ser Lys Gln Phe Arg Cys Leu Lys Asp Ala Ile			
180	185	190	
Ser Gly Gln Ile Lys Asp Thr Ser Lys Thr Leu Gly Glu Glu Asn			
195	200	205	
Ile Gly Gly Lys Ile Glu Gly Ser Lys Leu Lys Phe Val Asp His His			
210	215	220	
Leu Arg Gln Gln Arg Ala Leu Gln Gln Leu Gly Met Met Gln Thr Asn			
225	230	235	240
Ala Trp Lys Pro Gln Arg Gly Leu Pro Glu Arg Ala Val Ser Val Leu			
245	250	255	
Arg Ala Trp Leu Phe Glu His Phe Leu His Pro Tyr Pro Lys Asp Ser			
260	265	270	
Asp Lys Ile Ile Leu Ala Lys Gln Thr Gly Leu Thr Arg Ser Gln Val			
275	280	285	
Ser Asn Trp Phe Ile Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val			
290	295	300	
Glu Glu Met Tyr Met Glu Glu Val Lys Lys Asn Asn Gln Glu Gln Asn			
305	310	315	320
Ile Glu Pro Asn Asn Asn Glu Ile Val Gly Ser Lys Ser Ser Val Pro			
325	330	335	
Gln Glu Lys Leu Pro Ile Ser Ser Asn Ile Ile His Asn Ala Ser Pro			
340	345	350	
Asn Asp Ile Ser Thr Ser Thr Ile Ser Thr Ser Pro Thr Gly Gly Gly			
355	360	365	
Gly Ser Ile Pro Thr Gln Thr Val Ala Gly Phe Ser Phe Ile Arg Ser			
370	375	380	
Leu Asn Met Glu Asn Ile Asp Asp Gln Arg Asn Asn Lys Lys Ala Arg			
385	390	395	400
Asn Glu Met Gln Asn Cys Ser Thr Ser Thr Ile Leu Ser Met Glu Arg			

405

410

415

Glu Ile Ile Asn Lys Val Val Gln Asp Glu Thr Ile Lys Ser Glu Lys
420 425 430

Phe Asn Asn Thr Gln Thr Arg Glu Cys Tyr Ser Leu Met Thr Pro Asn
435 440 445

Tyr Thr Met Asp Asp Gln Phe Gly Thr Arg Phe Asn Asn Gln Asn His
450 455 460

Glu Gln Leu Ala Thr Thr Thr Phe His Gln Gly Asn Gly His Val
465 470 475 480

Ser Leu Thr Leu Gly Leu Pro Pro Asn Ser Glu Asn Gln His Asn Tyr
485 490 495

Ile Gly Leu Glu Asn His Tyr Asn Gln Pro Thr His His Pro Asn Ile
500 505 510

Ser Tyr Glu Asn Ile Asp Phe Gln Ser Gly Lys Arg Tyr Ala Thr Gln
515 520 525

Leu Leu Gln Asp Phe Val Ser
530 535

<210> 5

<211> 1920

<212> DNA

<213> Solanum tuberosum

<400> 5

ggggagcgag tggttccgac aaggtatggt aatgggtgga ggtgcaagta gtcaacaatt 60
gggatatgca aaaaatcata ctcctaattgt ggccgagtc atgcaacttt ttctaatgaa 120
tccacaacca aggtcacctt ctccatctcc tcctaattca acttcttcta cgttcacat 180
gttgttacca aacccatcat ctacttcaac acttcaaggg tttcctaattc cggccgaagg 240
atctttcggt caattcatta catggggaa tggaggagca agtgctgcca cagccaccca 300
tcatctcaat gcccagaatg aaatcgagg agtaaacgtt gtagaaagtc aaggcctatc 360
tctatccttgc ttttcttcgt tacagcacaa ggcggaggaa ttacaaatga gcggagaagc 420
tggaggaatg atgttcttca atcaaggagg gtcttagtact tccggcagt atcgatacaa 480
gaatttgaat atgggtggat caggagtaag cccaaacatt catcaagtcc atgttgggta 540
tgggtcatca ttaggagtgg tcaatgtgtt gaggaattcc aaatacgcga aagctgccc 600
agaactactg gaagaattct gcagtgtgg aagaggtaaa ttgaagaaga ctaacaacaa 660
agcagcagcc aataacccta atacgaaccc tagtggcgt aacaatgaag cttcttcaaa 720
agatgttcct actttgtccg ctgctgatag aattgagcat cagagaagga aggtcaaact 780
tttatctatg gttgatgagg tagataggag gtacaatcat tactgtgaac aaatgcagat 840
ggttgtaaat tcgtttgatt tagtgtatggg tttcggcaca gcagttccct acacagcact 900

tgcacagaag gcaatgtcaa gacatttcag gtgtttaag gatcaatag gagcacaatt 960
gaagcagagt tgtgagttat taggagagaa agatgcagga aattcggat tgactaaagg 1020
agaaaactccg aggcttaaga tgcttgaaca aagtttggagg caacaaaggg cgttcacca 1080
aatgggaatg atggaacaag aagcttggag accacaaaaga ggcttacctg aacgttctgt 1140
caacattta agagcttggc ttttgagca ttttctacac ccgtatccaa gtgatgctga 1200
taaacatctg ttggcaagac agactggct ctccagaaaat caggtatcaa attggttcat 1260
taatgctagg gttcggttgc ggaaacccat ggtagaagat atgtatcaac aagaagccaa 1320
agatgaagat ggagatggag atgagaagag ccaaagccaa aacagtggca ataacataat 1380
tgcacaaaca ccaacgccta atagcctgac taacacttca tctactaata tgacgacgac 1440
aacagccct acaactacga cagctctagc tgctgcagag acaggaacag ctgccactcc 1500
cataactgtt acctcaagca aaagatccca aatcaatgcc acggatagtg acccttcaact 1560
tgttagcaatc aattcccttct ctgaaaacca agctacttt ccgaccaaca ttcatgatcc 1620
cgacgattgc cgtcgccggca acttatccgg tgacgacggg accaccacac atgatcatat 1680
ggggtccacc atgataaggt ttgggaccac tgctggtgac gtgtcactca ccttagggtt 1740
acgacatgca ggaaatttac cagagaatac tcatttctt ggttaattaa tacgtatttt 1800
ccccatagta attaattaaa actgaatttg cttgagctca tcataattt tgcattgctt 1860
tttggttataa gaaattccat aaattagctt tgtgttaaaa aaaaaaaaaa aaaaaaaaaa 1920

<210> 6

<211> 586

<212> PRT

<213> *Solanum tuberosum*

<400> 6

Met Val Met Gly Gly Ala Ser Ser Gln Gln Leu Gly Tyr Ala Lys
1 5 10 15

Asn His Thr Pro Asn Val Ala Glu Ser Met Gln Leu Phe Leu Met Asn
20 25 30

Pro Gln Pro Arg Ser Pro Ser Pro Ser Pro Pro Asn Ser Thr Ser Ser
35 40 45

Thr	Leu	His	Met	Leu	Leu	Pro	Asn	Pro	Ser	Ser	Thr	Ser	Thr	Leu	Gln
50						55					60				

Gly Phe Pro Asn Pro Ala Glu Gly Ser Phe Gly Gln Phe Ile Thr Trp
 65 70 75 80

Gly Asn Gly Gly Ala Ser Ala Ala Thr Ala Thr His His Leu Asn Ala
 85 90 95

Gln Asn Glu Ile Gly Gly Val Asn Val Val Glu Ser Gln Gly Leu Ser
 100 105 110

Leu Ser Leu Ser Ser Leu Gln His Lys Ala Glu Glu Leu Gln Met
115 120 125

Ser Gly Glu Ala Gly Gly Met Met Phe Phe Asn Gln Gly Gly Ser Ser
 130 135 140

 Thr Ser Gly Gln Tyr Arg Tyr Lys Asn Leu Asn Met Gly Gly Ser Gly
 145 150 155 160

 Val Ser Pro Asn Ile His Gln Val His Val Gly Tyr Gly Ser Ser Leu
 165 170 175

 Gly Val Val Asn Val Leu Arg Asn Ser Lys Tyr Ala Lys Ala Ala Gln
 180 185 190

 Glu Leu Leu Glu Glu Phe Cys Ser Val Gly Arg Gly Lys Leu Lys Lys
 195 200 205

 Thr Asn Asn Lys Ala Ala Asn Asn Pro Asn Thr Asn Pro Ser Gly
 210 215 220

 Ala Asn Asn Glu Ala Ser Ser Lys Asp Val Pro Thr Leu Ser Ala Ala
 225 230 235 240

 Asp Arg Ile Glu His Gln Arg Arg Lys Val Lys Leu Leu Ser Met Val
 245 250 255

 Asp Glu Val Asp Arg Arg Tyr Asn His Tyr Cys Glu Gln Met Gln Met
 260 265 270

 Val Val Asn Ser Phe Asp Leu Val Met Gly Phe Gly Thr Ala Val Pro
 275 280 285

 Tyr Thr Ala Leu Ala Gln Lys Ala Met Ser Arg His Phe Arg Cys Leu
 290 295 300

 Lys Asp Ala Ile Gly Ala Gln Leu Lys Gln Ser Cys Glu Leu Leu Gly
 305 310 315 320

 Glu Lys Asp Ala Gly Asn Ser Gly Leu Thr Lys Gly Glu Thr Pro Arg
 325 330 335

 Leu Lys Met Leu Glu Gln Ser Leu Arg Gln Gln Arg Ala Phe His Gln
 340 345 350

 Met Gly Met Met Glu Gln Glu Ala Trp Arg Pro Gln Arg Gly Leu Pro
 355 360 365

 Glu Arg Ser Val Asn Ile Leu Arg Ala Trp Leu Phe Glu His Phe Leu
 370 375 380

His Pro Tyr Pro Ser Asp Ala Asp Lys His Leu Leu Ala Arg Gln Thr			
385	390	395	400
Gly Leu Ser Arg Asn Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val			
405	410	415	
Arg Leu Trp Lys Pro Met Val Glu Asp Met Tyr Gln Gln Glu Ala Lys			
420	425	430	
Asp Glu Asp Gly Asp Gly Asp Glu Lys Ser Gln Ser Gln Asn Ser Gly			
435	440	445	
Asn Asn Ile Ile Ala Gln Thr Pro Thr Pro Asn Ser Leu Thr Asn Thr			
450	455	460	
Ser Ser Thr Asn Met Thr Thr Thr Ala Pro Thr Thr Thr Ala			
465	470	475	480
Leu Ala Ala Ala Glu Thr Gly Thr Ala Ala Thr Pro Ile Thr Val Thr			
485	490	495	
Ser Ser Lys Arg Ser Gln Ile Asn Ala Thr Asp Ser Asp Pro Ser Leu			
500	505	510	
Val Ala Ile Asn Ser Phe Ser Glu Asn Gln Ala Thr Phe Pro Thr Asn			
515	520	525	
Ile His Asp Pro Asp Asp Cys Arg Arg Gly Asn Leu Ser Gly Asp Asp			
530	535	540	
Gly Thr Thr Thr His Asp His Met Gly Ser Thr Met Ile Arg Phe Gly			
545	550	555	560
Thr Thr Ala Gly Asp Val Ser Leu Thr Leu Gly Leu Arg His Ala Gly			
565	570	575	
Asn Leu Pro Glu Asn Thr His Phe Phe Gly			
580	585		

<210> 7

<211> 2103

<212> DNA

<213> Solanum tuberosum

<400> 7

aaccnaaaaa agagatcgaa ttcggcacga gtgatcatgg tccttcgtct tctaaagaaca 60

ttattagtga acaattttac caacatggta gtcatgaaaa tatgttgaca acaacaacta 120
ctcatcatga tgcgtcatcaa ggctcggtgc atcacgataa taacagaaca ttacttgaa 180
atgatccatc tatgagatgt gtttccctt gtgaaggaaa tgaaaggcca agtcatggac 240
tttcattatc tctttgttcc tcaaattccat caagtattgg tttacaatct tttgaactt 300
gacatcaaga tttgcaacaa ggattaatac atgatggatt tttggtaaa tctacaaaata 360
tacaacaagg gtatttcat catcatcatc aagtttaggaa ctcgaataat ttaggtccgg 420
ctcaagagtt gctcagttag 420
ttctgttagtc tcgaaataaa gaagaataat gatcattctt 480
cttcaaaagt acttctaaag caacatgaga gtactgctag tacttcaaaa aagcaactt 540
tacagtctct tgacccccc 540
tgacccccc 540
gaacttcaaa aaagaaagac aaaattgctt caaatgctt 600
aagaggtgga tagaaggtaa aagcattatt gtatcatcat 660
ttgaagcagt ggctggaaat ggagcagcaa cagttactc agccttagca tcaagggcta 720
tgtcaaggca ttttagatgt ttaagagatg gaattgtggc acaaattaag gccacaaaaa 780
tggctatggg agaaaaagac agtacttaga ctcttattcc tggtaaca agaggtgaaa 840
caccacact cagacttctt gatcaaactt taaggcaaca aaaggcttc caacagatga 900
atatgatgga gactcatcca tggagaccgc aacgtggctt cccagaaaga tcagtctccg 960
ttctccgcgc ttggctctt gaacacttcc ttcacccgta cccaaatgtt gttgataaac 1020
acatttttagc tcgccaactt ggtcttcaa gaagccaggt gtctaattgg ttcattaatg 1080
caaggtaag gctatgaaag ccaatggtg aagaaaatgtt cttagaagaa acaaaaagaag 1140
aagaaaatgtt tggatctcca gatggatcaa aagccctaat tgatgacatg acaattcatc 1200
aatcacacat tgatcatcat caagctgatc aaaagccaaa tcttgcata attgactctg 1260
aatgcatatc ttccatcata aatcatcaac ctcatgagaa aatgatcaa aactatggag 1320
taatttaggg tggagatcaa tcgtttggcg cgattgagct agattttca acaaataattg 1380
cttaggtac tagtggtggt gaccatcatc atcatggagg gggtgttct ttaacattgg 1440
gattacaaca acatggtgga agtggtgat catcaatggg gttaactaca ttttcatcac 1500
aaccatctca taatcaaagt tcactttttt atccaagaga tgatgatcaa gttcaatatt 1560
catcacttt ggatagtgaa aatcagaatt tgccatataa aaaccttgat gggggcaca 1620
cttcttcattt atttggctgg ttaaaaaatg acagagattt ttcattttgg accttattat 1680
atactctaattt ttaatataat attggtgatg aatgatgata aaaaaaaaaa aaaaaaaaaa 1740
aaaaaaaaaa aaaaaaaaaa acctcgancg cggtcgactn tanancccta tagngagtcg 1800
tnnnctgca nanatctntg aatcgtaat nctgaaaaac cccgcaagtt cacttcaact 1860
gngcatcgng cnccatctca atttcttca tttatncatc gtttgcctt nttttatgtt 1920
actatnctcc tntaagtttcc aatcttggcc atgtaacctn tgatctntaa aattttttaa 1980
atgactanaa ttaatgccc tntttttt ggacctaaat tnttcatgaa aatntnttnc 2040
naggctnt tcaaaanctt tggacttntt cnccanaggt ttggctcaagt ntccaatcaa 2100
ggt 2103

<210> 8
<211> 589
<212> PRT
<213> Solanum tuberosum

<400> 8
Met Val Asn His Gln Leu Gln Asn Phe Glu Thr Asn Pro Glu Met Tyr
1 5 10 15

Asn Leu Ser Ser Thr Thr Ser Ser Met Asp Gln Met Ile Gly Phe Pro
20 25 30

Pro	Asn	Asn	Asn	Asn	Pro	His	His	Val	Leu	Trp	Lys	Gly	Asn	Phe	Pro	
35					40						45					
Asn	Lys	Ile	Asn	Gly	Val	Asp	Asp	Asp	Asp	His	Gly	Pro	Ser	Ser	Ser	
50					55					60						
Lys	Asn	Ile	Ile	Ser	Glu	Gln	Phe	Tyr	Gln	His	Gly	Ser	His	Glu	Asn	
65					70				75				80			
Met	Leu	Thr	Thr	Thr	Thr	His	His	Asp	Asp	His	Gln	Gly	Ser	Trp		
		85				90					95					
His	His	Asp	Asn	Asn	Arg	Thr	Leu	Leu	Val	Asp	Asp	Pro	Ser	Met	Arg	
		100				105						110				
Cys	Val	Phe	Pro	Cys	Glu	Gly	Asn	Glu	Arg	Pro	Ser	His	Gly	Leu	Ser	
		115			120				125							
Leu	Ser	Leu	Cys	Ser	Ser	Asn	Pro	Ser	Ser	Ile	Gly	Leu	Gln	Ser	Phe	
		130			135					140						
Glu	Leu	Arg	His	Gln	Asp	Leu	Gln	Gln	Gly	Leu	Ile	His	Asp	Gly	Phe	
145			150			155					160					
Leu	Gly	Lys	Ser	Thr	Asn	Ile	Gln	Gln	Gly	Tyr	Phe	His	His	His	His	
		165			170					175						
Gln	Val	Arg	Asp	Ser	Lys	Tyr	Leu	Gly	Pro	Ala	Gln	Glu	Leu	Ser		
		180			185					190						
Glu	Phe	Cys	Ser	Leu	Gly	Ile	Lys	Lys	Asn	Asn	Asp	His	Ser	Ser	Ser	
		195			200					205						
Lys	Val	Leu	Leu	Lys	Gln	His	Glu	Ser	Thr	Ala	Ser	Thr	Ser	Lys		
		210			215				220							
Gln	Leu	Leu	Gln	Ser	Leu	Asp	Leu	Leu	Glu	Leu	Gln	Lys	Arg	Lys	Thr	
225			230			235					240					
Lys	Leu	Leu	Gln	Met	Leu	Glu	Glu	Val	Asp	Arg	Arg	Tyr	Lys	His	Tyr	
		245			250					255						
Cys	Asp	Gln	Met	Lys	Ala	Val	Val	Ser	Ser	Phe	Glu	Ala	Val	Ala	Gly	
		260			265					270						
Asn	Gly	Ala	Ala	Thr	Val	Tyr	Ser	Ala	Leu	Ala	Ser	Arg	Ala	Met	Ser	
		275			280					285						

Arg His Phe Arg Cys Leu Arg Asp Gly Ile Val Ala Gln Ile Lys Ala
 290 295 300
 Thr Lys Met Ala Met Gly Glu Lys Asp Ser Thr Ser Thr Leu Ile Pro
 305 310 315 320
 Gly Ser Thr Arg Gly Glu Thr Pro Arg Leu Arg Leu Leu Asp Gln Thr
 325 330 335
 Leu Arg Gln Gln Lys Ala Phe Gln Gln Met Asn Met Met Glu Thr His
 340 345 350
 Pro Trp Arg Pro Gln Arg Gly Leu Pro Glu Arg Ser Val Ser Val Leu
 355 360 365
 Arg Ala Trp Leu Phe Glu His Phe Leu His Pro Tyr Pro Ser Asp Val
 370 375 380
 Asp Lys His Ile Leu Ala Arg Gln Thr Gly Leu Ser Arg Ser Gln Val
 385 390 395 400
 Ser Asn Trp Phe Ile Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val
 405 410 415
 Glu Glu Met Tyr Leu Glu Glu Thr Lys Glu Glu Asn Val Gly Ser
 420 425 430
 Pro Asp Gly Ser Lys Ala Leu Ile Asp Asp Met Thr Ile His Gln Ser
 435 440 445
 His Ile Asp His His Gln Ala Asp Gln Lys Pro Asn Leu Val Arg Ile
 450 455 460
 Asp Ser Glu Cys Ile Ser Ser Ile Ile Asn His Gln Pro His Glu Lys
 465 470 475 480
 Asn Asp Gln Asn Tyr Gly Val Ile Arg Gly Gly Asp Gln Ser Phe Gly
 485 490 495
 Ala Ile Glu Leu Asp Phe Ser Thr Asn Ile Ala Tyr Gly Thr Ser Gly
 500 505 510
 Gly Asp His His His Gly Gly Gly Val Ser Leu Thr Leu Gly Leu
 515 520 525
 Gln Gln His Gly Gly Ser Gly Gly Ser Ser Met Gly Leu Thr Thr Phe
 530 535 540

<210> 9
<211> 1939
<212> DNA
<213> *Solanum tuberosum*

<400> 9
acgagcgtt atgagacagc cggttggc tctgaaatgt tcaattttca gacaacatcc 60
acggctgcaa ctgaattgtt gcagaatcaa ttgtcaaata actatagaca cccgaatcaa 120
cagccacatc atcaacctcc gaccaggag tgggttggta acagacaaga gatcgtagtt 180
ggtggaaagtt tgcaaggtaac atttggggat acaaaaagatg atgtgaatgc gaaggttata 240
tttagtaacc gtgatagtgt aactgattat tatcagcgtc aacacaatca agtaccaagt 300
ataaaataccg cgaggtccat gcaactttt cttatgaatc cacaaccaag ttcaccatca 360
caatctactc ctcaactct tcatcaaggg ttttcttagcc cggtcggagg gcatttttagt 420
caattcatgt gtggaggagc aagtacttct tcaaattccaa ttggaggagt aaatgtgatt 480
gatcaagggc aaggtcttc attgtccttg tcatctactt tacaacattt ggaagcatcc 540
aaagtggaaag atttgaggat gaatagtggc ggagaaaatgt tgttttcaa tcaagaaagt 600
caaaaatcatc ataataattgg ttttgggtca tcaactaggac tagtcaatgt gttgaggaat 660
tcaaagtatg tcaaagcaac acaagagttg ttggaaagagt tttttgtgt tggaaagggt 720
caattgttca agaaaatcaa caaagttct aggaataaca acacaagtac atcaccatt 780
attaacccta gtggaaagtaa taacaataat tcatcttctt caaaggctat tatccctcct 840
aatttgcata ctgcagagag acttgatcat caaagaagga aggtcaaact tttatccatg 900
cttgcatttgc tagagaaaag atacaaccac tattgtgaac aaatgcagat ggttagtaaac 960
tcattcgtatc tagtgcatttgc ttttggagct gcagttccctt acacagcact agcacaagaaa 1020
gccatgtcta ggcatttcaa gtgtttaaaa gatggcgtgg cggcgaatt gaagaagaca 1080
tgtgaggcac taggtgaaaaa agatgcaagc agtagttcag gactgactaa aggagaaaaca 1140
ccaaggctta aggtgcttgc acaaagcttgc aggcaacaaa gagctttca acaaattggc 1200
atgtggaac aagaagcttgc gaggccacaa agaggattgc ctgaacgatc tgtcaatatt 1260
ttaagagctt ggctttcgatc acattttcta catccgtatc caagtgtatc agataagcat 1320
ctttggcac gacagactgg tctctccaga aaccaggtag caaactggtt catabatgc 1380
agggtgagat tgtggaaacc catggtagaa gaaatgtatc aaagagaggt taatgaagat 1440
gatgttgcattc acatgcaaga aaacccaaac agtacaaata cacaatacc aacgcctaat 1500
attattatttca accatcaatttca acatttaca gaaacaaaat cagctgccat tgccacaatt 1560
gcttcagaca aaaaacccca aatcaatgtc tctgaaatttgc acccttcaat tgtcgcaatg 1620
aatacacatttca accatcccttca tattttttttca accatcaatgtc tctgaaatttgc 1680
gagtccgacc acatcttata tcgccccacttgc cggccgacttgc ggagcgaaat atgggaccac 1740
agtaattctg aatattggatc caacatgata acatttgggc ccactacggc tagtgcatttgc 1800
tcacttacccatc taggactgcg ccatgcgggt aatatttgc aatatttgc tttttccgggt 1860

taattaagat agtgtattca aacactgcta cataaattat gatttatat atatatata 1920
tgtcatccga ttagttat 1939

<210> 10
<211> 620
<212> PRT
<213> Solanum tuberosum

<400> 10
Thr Ser Val Tyr Glu Thr Ala Gly Leu Leu Ser Glu Met Phe Asn Phe
1 5 10 15
Gln Thr Thr Ser Thr Ala Ala Thr Glu Leu Leu Gln Asn Gln Leu Ser
20 25 30
Asn Asn Tyr Arg His Pro Asn Gln Gln Pro His His Gln Pro Pro Thr
35 40 45
Arg Glu Trp Phe Gly Asn Arg Gln Glu Ile Val Val Gly Gly Ser Leu
50 55 60
Gln Val Thr Phe Gly Asp Thr Lys Asp Asp Val Asn Ala Lys Val Leu
65 70 75 80
Leu Ser Asn Arg Asp Ser Val Thr Asp Tyr Tyr Gln Arg Gln His Asn
85 90 95
Gln Val Pro Ser Ile Asn Thr Ala Glu Ser Met Gln Leu Phe Leu Met
100 105 110
Asn Pro Gln Pro Ser Ser Pro Ser Gln Ser Thr Pro Ser Thr Leu His
115 120 125
Gln Gly Phe Ser Ser Pro Val Gly Gly His Phe Ser Gln Phe Met Cys
130 135 140
Gly Gly Ala Ser Thr Ser Ser Asn Pro Ile Gly Gly Val Asn Val Ile
145 150 155 160
Asp Gln Gly Gln Gly Leu Ser Leu Ser Leu Ser Thr Leu Gln His
165 170 175
Leu Glu Ala Ser Lys Val Glu Asp Leu Arg Met Asn Ser Gly Gly Glu
180 185 190
Met Leu Phe Phe Asn Gln Glu Ser Gln Asn His His Asn Ile Gly Phe
195 200 205

Gly Ser Ser Leu Gly Leu Val Asn Val Leu Arg Asn Ser Lys Tyr Val
 210 215 220

 Lys Ala Thr Gln Glu Leu Leu Glu Glu Phe Cys Cys Val Gly Lys Gly
 225 230 235 240

 Gln Leu Phe Lys Lys Ile Asn Lys Val Ser Arg Asn Asn Asn Thr Ser
 245 250 255

 Thr Ser Pro Ile Ile Asn Pro Ser Gly Ser Asn Asn Asn Ser Ser
 260 265 270

 Ser Ser Lys Ala Ile Ile Pro Pro Asn Leu Ser Thr Ala Glu Arg Leu
 275 280 285

 Asp His Gln Arg Arg Lys Val Lys Leu Leu Ser Met Leu Asp Glu Val
 290 295 300

 Glu Lys Arg Tyr Asn His Tyr Cys Glu Gln Met Gln Met Val Val Asn
 305 310 315 320

 Ser Phe Asp Leu Val Met Gly Phe Gly Ala Ala Val Pro Tyr Thr Ala
 325 330 335

 Leu Ala Gln Lys Ala Met Ser Arg His Phe Lys Cys Leu Lys Asp Gly
 340 345 350

 Val Ala Ala Gln Leu Lys Lys Thr Cys Glu Ala Leu Gly Glu Lys Asp
 355 360 365

 Ala Ser Ser Ser Ser Gly Leu Thr Lys Gly Glu Thr Pro Arg Leu Lys
 370 375 380

 Val Leu Glu Gln Ser Leu Arg Gln Gln Arg Ala Phe Gln Gln Met Gly
 385 390 395 400

 Met Met Glu Gln Glu Ala Trp Arg Pro Gln Arg Gly Leu Pro Glu Arg
 405 410 415

 Ser Val Asn Ile Leu Arg Ala Trp Leu Phe Glu His Phe Leu His Pro
 420 425 430

 Tyr Pro Ser Asp Ala Asp Lys His Leu Leu Ala Arg Gln Thr Gly Leu
 435 440 445

 Ser Arg Asn Gln Val Ala Asn Trp Phe Ile Asn Ala Arg Val Arg Leu
 450 455 460

Trp Lys Pro Met Val Glu Glu Met Tyr Gln Arg Glu Val Asn Glu Asp
465 470 475 480

Asp Val Asp Asp Met Gln Glu Asn Gln Asn Ser Thr Asn Thr Gln Ile
485 490 495

Pro Thr Pro Asn Ile Ile Ile Thr Thr Asn Ser Asn Ile Thr Glu Thr
500 505 510

Lys Ser Ala Ala Thr Ala Thr Ile Ala Ser Asp Lys Lys Pro Gln Ile
515 520 525

Asn Val Ser Glu Ile Asp Pro Ser Ile Val Ala Met Asn Thr His Tyr
530 535 540

Ser Ser Ser Met Pro Thr Gln Leu Thr Asn Phe Pro Thr Ile Gln Asp
545 550 555 560

Glu Ser Asp His Ile Leu Tyr Arg Arg Ser Gly Ala Glu Tyr Gly Thr
565 570 575

Thr Asn Met Ala Ser Asn Ser Glu Ile Gly Ser Asn Met Ile Thr Phe
580 585 590

Gly Thr Thr Thr Ala Ser Asp Val Ser Leu Thr Leu Gly Leu Arg His
595 600 605

Ala Gly Asn Leu Pro Glu Asn Thr His Phe Ser Gly
610 615 620

<210> 11

<211> 2128

<212> DNA

<213> Solanum tuberosum

<400> 11
caaggcctt cacttagcct gtcctcgtcc cagcagccgg ggtttggaa cttcacggcg 60
gcgcgtgagc ttgtttcttc gccttcgggt tcggcttcag ctccaggat acaacaacaa 120
caacagcaac aacagagat tagtagtgtg ctttgagtt ctaagtacat gaaggctgca 180
caagagctac ttgatgaagt tgtaaatgtt gaaaaatcaa tgaaaaagtac taatagtact 240
gatgttggtg ttaataatga tgtcaagaaa tcgaagaata tggcgatat ggacggacag 300
ttagacggag ttggagcaga caaagacgga gctccaacaa ctgagctaag tacaggggag 360
agacaagaaa ttcaaatgaa gaaagcaaaa cttgttaaca tgcttgacga ggtggagcag 420
aggtatagac attatcatca ccaaattgcag tcagtgatac attggttaga gcaagctgct 480
ggcattggat cagcaaaaac atatacagca ttggcttgc agacgatttc gaagcaattt 540
aggtgtctta aggacgcgat aattggtcaa atacgatcag caagccagac gttaggcgaa 600

gaagatagtt tgggagggaa gattgaaggt tcaaggctta aatttggta taatcagcta 660
 agacagcaaa gggcttgca acaattggga atgatccagc ataatgctt gagacctca 720
 agaggattgc ccgaacgagc tgtttctgtt cttcgcgctt ggcttttga acatttcctc 780
 catccttatac ccaaggattc agacaaaatg atgctagcaa aacaaacagg actaactagg 840
 agtcaggtgt cgaattgggtt catcaatgct cgagttcgtc tttggaaagcc aatggtgaa 900
 gagatgtact tggaagagat aaaagaacac gaacagaatg gggtgggtca agaaaagacg 960
 agcaaattag gtgaacagaa cgaagattca acaacatcaa gatccattgc tacacaagac 1020
 aaaagccctg gttcagatag ccaaaaacaag agttttgtct caaaaacagga caatcattt 1080
 cctcaacaca accctgcttc accaatgccc gatgtccaac gccacttcca tacccttatac 1140
 ggtatgacca tccgtaatca gtctgctggt ttcaacctca ttggatcacc agagatcgaa 1200
 agcatcaaca ttactcaagg gagtccaaag aaaccgagga acaacgagat gttgcattca 1260
 ccaaacagca ttccatccat caacatggat gtaaagccta acgaggaaca aatgtcgatg 1320
 aagtttggtg atgataggca ggacagagat ggattctcac taatgggagg accgatgaac 1380
 ttcatgggag gattcggagc ctatcccatt ggagaaattt gtcgggttag caccgagcaa 1440
 ttctcagcac catactcaac cagttggcaca gtttcaactca ctcttggctt accacataac 1500
 gaaaacctct caatgtctgc aacacaccac agtttcccttc caattccaac acaaaacatc 1560
 caaattggaa gtgaacccaa tcatgagttt ggtagcttaa acacaccaac atcagctcac 1620
 tcaacatcaa gcgtctatga aaccttcaac attcagaaca gaaagagggtt cgccgcaccc 1680
 ttgttaccag attttggcgc ctgatcacaa aaacaaaaac aggtttggc aacagacaaa 1740
 ctctgtcgc taaaacaagga catgatttag cgacagataa cttcagtcgc taacttagcg 1800
 actgaaaact tctgtcgcta agcatgaaca tgtattagcg acatacagta tgcaactgta 1860
 tgtcaactaa caagaacatg atgaatttagt gacggacaac ttctgtcgct aaacaacaaa 1920
 aaaaaatcca tggtttagta tattgttctt cattctatca tatcatggta gtgtaaagaa 1980
 tcaagaaaaca agttttacat agtaacagtc ttatatacatt ggagatgaag aaccattaa 2040
 gttcttcaaa atagatagat ttcttaggtt acttctanaa gatatatata tggttgaggg 2100
 tttgtatatt aaaaaaaaaa aaaaaaaaaa 2128

<210> 12

<211> 567

<212> PRT

<213> Solanum tuberosum

<400> 12

Gln	Gly	Leu	Ser	Leu	Ser	Leu	Ser	Ser	Gln	Gln	Pro	Gly	Phe	Gly
1														
														10
														15

Asn	Phe	Thr	Ala	Ala	Arg	Glu	Leu	Val	Ser	Ser	Pro	Ser	Gly	Ser	Ala
														20	
															30

Ser	Ala	Ser	Gly	Ile	Gln	Gln	Gln	Gln	Gln	Gln	Ser	Ile	Ser	
														35
														40
														45

Ser	Val	Pro	Leu	Ser	Ser	Lys	Tyr	Met	Lys	Ala	Ala	Gln	Glu	Leu	Leu
															50
															55
															60

Asp	Glu	Val	Val	Asn	Val	Gly	Lys	Ser	Met	Lys	Ser	Thr	Asn	Ser	Thr
															65
															70
															75
															80

Asp Val Val Val Asn Asn Asp Val Lys Lys Ser Lys Asn Met Gly Asp		
85	90	95
Met Asp Gly Gln Leu Asp Gly Val Gly Ala Asp Lys Asp Gly Ala Pro		
100	105	110
Thr Thr Glu Leu Ser Thr Gly Glu Arg Gln Glu Ile Gln Met Lys Lys		
115	120	125
Ala Lys Leu Val Asn Met Leu Asp Glu Val Glu Gln Arg Tyr Arg His		
130	135	140
Tyr His His Gln Met Gln Ser Val Ile His Trp Leu Glu Gln Ala Ala		
145	150	155
Gly Ile Gly Ser Ala Lys Thr Tyr Thr Ala Leu Ala Leu Gln Thr Ile		
165	170	175
Ser Lys Gln Phe Arg Cys Leu Lys Asp Ala Ile Ile Gly Gln Ile Arg		
180	185	190
Ser Ala Ser Gln Thr Leu Gly Glu Asp Ser Leu Gly Gly Lys Ile		
195	200	205
Glu Gly Ser Arg Leu Lys Phe Val Asp Asn Gln Leu Arg Gln Gln Arg		
210	215	220
Ala Leu Gln Gln Leu Gly Met Ile Gln His Asn Ala Trp Arg Pro Gln		
225	230	235
Arg Gly Leu Pro Glu Arg Ala Val Ser Val Leu Arg Ala Trp Leu Phe		
245	250	255
Glu His Phe Leu His Pro Tyr Pro Lys Asp Ser Asp Lys Met Met Leu		
260	265	270
Ala Lys Gln Thr Gly Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile		
275	280	285
Asn Ala Arg Val Arg Leu Trp Lys Pro Met Val Glu Glu Met Tyr Leu		
290	295	300
Glu Glu Ile Lys Glu His Glu Gln Asn Gly Leu Gly Gln Glu Lys Thr		
305	310	315
Ser Lys Leu Gly Glu Gln Asn Glu Asp Ser Thr Thr Ser Arg Ser Ile		
325	330	335

Ala Thr Gln Asp Lys Ser Pro Gly Ser Asp Ser Gln Asn Lys Ser Phe
 340 345 350

 Val Ser Lys Gln Asp Asn His Leu Pro Gln His Asn Pro Ala Ser Pro
 355 360 365

 Met Pro Asp Val Gln Arg His Phe His Thr Pro Ile Gly Met Thr Ile
 370 375 380

 Arg Asn Gln Ser Ala Gly Phe Asn Leu Ile Gly Ser Pro Glu Ile Glu
 385 390 395 400

 Ser Ile Asn Ile Thr Gln Gly Ser Pro Lys Lys Pro Arg Asn Asn Glu
 405 410 415

 Met Leu His Ser Pro Asn Ser Ile Pro Ser Ile Asn Met Asp Val Lys
 420 425 430

 Pro Asn Glu Glu Gln Met Ser Met Lys Phe Gly Asp Asp Arg Gln Asp
 435 440 445

 Arg Asp Gly Phe Ser Leu Met Gly Gly Pro Met Asn Phe Met Gly Gly
 450 455 460

 Phe Gly Ala Tyr Pro Ile Gly Glu Ile Ala Arg Phe Ser Thr Glu Gln
 465 470 475 480

 Phe Ser Ala Pro Tyr Ser Thr Ser Gly Thr Val Ser Leu Thr Leu Gly
 485 490 495

 Leu Pro His Asn Glu Asn Leu Ser Met Ser Ala Thr His His Ser Phe
 500 505 510

 Leu Pro Ile Pro Thr Gln Asn Ile Gln Ile Gly Ser Glu Pro Asn His
 515 520 525

 Glu Phe Gly Ser Leu Asn Thr Pro Thr Ser Ala His Ser Thr Ser Ser
 530 535 540

 Val Tyr Glu Thr Phe Asn Ile Gln Asn Arg Lys Arg Phe Ala Ala Pro
 545 550 555 560

 Leu Leu Pro Asp Phe Val Ala
 565

<211> 2065
<212> DNA
<213> Solanum tuberosum

<400> 13
atctccaagt aaaaaggta ttgagaaaag taacacagat ggcgacttat ttcctagtc 60
caaacaatca aagagatgct gatcagacat ttcaatattt taggcaatct ttgcctgagt 120
cttattcaga agttcaaat gctccagaaa acatgatggt attcatgaac tattttctt 180
ctggggcata ttcatatgatg ttgacggta ctccccaca acaacacaac tgcacatcgata 240
tccccatctt aggagccacg cctttcaaca catccccaca agaaatattt tcaaattctt 300
gaggatcgca gatggggatt caggatttt cttcatggag agatagcaga aatgagatgc 360
tagctgataa tgtcttcaa gttgcacaaa atgtgcaggg tcaaggatta tccctcagtc 420
ttggctccaa tataccatct ggaattggaa tttcacatgt ccaatctcg aatcctaacc 480
aagggtggcg tttAACATG tcctttggag atgggtataa ttccccacca aaagaacaaa 540
gaaatgcaga ttatTTTCTT ccggataatc ctggaaaggga cttggatgct atgaaagggt 600
ataattctcc atatggtacg tcgagtattt caaggaccat tcccaatctcg aagtatttga 660
aagcagctca atatTTGCTT gatgaggtt ttagtgcag aaaggccatc aaggagcaaa 720
attctaagaa agagttgaca aaggatcca gagagtctga tgtggactcg aaaaatata 780
catcagatac tcctgcaaat gggggTCAA atcctcatga gtccaaaaac aaccaaagt 840
aactttcacc taccgagaag caagaagtgc agaacaactt ggcacaaactt ctgtcaatgc 900
tggatgagat tggatgatg tacagacaat attatcatca gatgcaataa gtggTTTcat 960
catttgcgt ggttagctgga gaaggagcag ctaaaccata cacagctttt gctctccaga 1020
caattttcccg acacttccgt tgcttgcgtg atgcaatctg cgatcagatt cgagcatcac 1080
gaagaagtct tggagagcaa gatgcttcgaaaacagcaa agcgatttga atatcacg 1140
tgcgtttgtt ggtatcatcat attagacagc agagagccct gcagcagctt ggtatgtgc 1200
aacaacatgc ctggaggcct cagagggat tgcctgaaag ctctgtttca gtttgcgtg 1260
cttggctctt ttagcacttt cttcatccct acccgaaaga ttctgacaaa attatgctag 1320
caaggcaaac tggcttaacg agaagtcaagg tatcaaattt gttcataat gcacgggtgc 1380
gtctttggaa acccatgggtt gaggaaatgt acaaagaaga ggctgggtat gctaaaatag 1440
actcaaattt ttcattcggat gttggcccca gacttgcaccaaaagactca aaagttaag 1500
aaagaggaga attgcaccag aatgcagctt cagaatttga gcagtcataat agtggccaaa 1560
tcctggagtc aaaatctaac catgaagctg atgttagaaaat ggaggagca agtaatgcag 1620
aaactcaaag tcaatctgga atggaaaacc aaacaggcga acccctgcct gctatggata 1680
attgcaccct tttcaggac gcatttgcgtt aaagcaacga tagattctca gaatttggta 1740
gttttggaaag tgaaatgtt ctacccaatg gagtttcaact tacattgggg ctgcagcaag 1800
gtgaagaag caacctacccat atgtccatcg aaactcacgt tagttatgtt ccattaagg 1860
cagatgacat gtatagtaca gcacccatca ctatggtccc tgaaacagca gaattcaact 1920
gcttggattc tggaaatagg cagcaaccat tttggctctt accatctgct acatgatTTT 1980
gtatgtgttg tagaattttt ctgcaagttt tgactacatc aacattcatc ttcaaaaaaaa 2040
aaaaaaaaaaaa aaaaaaaaaaaa aaaaaa 2065

<210> 14
<211> 645
<212> PRT
<213> Solanum tuberosum

<400> 14

Met	Ala	Thr	Tyr	Phe	Pro	Ser	Pro	Asn	Asn	Gln	Arg	Asp	Ala	Asp	Gln
1				5						10				15	
Thr	Phe	Gln	Tyr	Phe	Arg	Gln	Ser	Leu	Pro	Glu	Ser	Tyr	Ser	Glu	Ala
				20				25				30			
Ser	Asn	Ala	Pro	Glu	Asn	Met	Met	Val	Phe	Met	Asn	Tyr	Ser	Ser	Ser
					35			40				45			
Gly	Ala	Tyr	Ser	Asp	Met	Leu	Thr	Gly	Thr	Ser	Gln	Gln	Gln	His	Asn
					50			55				60			
Cys	Ile	Asp	Ile	Pro	Ser	Ile	Gly	Ala	Thr	Pro	Phe	Asn	Thr	Ser	Gln
					65			70			75			80	
Gln	Glu	Ile	Leu	Ser	Asn	Leu	Gly	Gly	Ser	Gln	Met	Gly	Ile	Gln	Asp
					85				90				95		
Phe	Ser	Ser	Trp	Arg	Asp	Ser	Arg	Asn	Glu	Met	Leu	Ala	Asp	Asn	Val
					100				105				110		
Phe	Gln	Val	Ala	Gln	Asn	Val	Gln	Gly	Gln	Gly	Leu	Ser	Leu	Ser	Leu
					115			120				125			
Gly	Ser	Asn	Ile	Pro	Ser	Gly	Ile	Gly	Ile	Ser	His	Val	Gln	Ser	Gln
					130			135			140				
Asn	Pro	Asn	Gln	Gly	Gly	Phe	Asn	Met	Ser	Phe	Gly	Asp			
					145			150			155			160	
Asn	Ser	Gln	Pro	Lys	Glu	Gln	Arg	Asn	Ala	Asp	Tyr	Phe	Pro	Pro	Asp
					165				170				175		
Asn	Pro	Gly	Arg	Asp	Leu	Asp	Ala	Met	Lys	Gly	Tyr	Asn	Ser	Pro	Tyr
					180				185			190			
Gly	Thr	Ser	Ser	Ile	Ala	Arg	Thr	Ile	Pro	Ser	Ser	Lys	Tyr	Leu	Lys
					195			200				205			
Ala	Ala	Gln	Tyr	Leu	Leu	Asp	Glu	Val	Val	Ser	Val	Arg	Lys	Ala	Ile
					210			215				220			
Lys	Glu	Gln	Asn	Ser	Lys	Lys	Glu	Leu	Thr	Lys	Asp	Ser	Arg	Glu	Ser
					225			230			235			240	
Asp	Val	Asp	Ser	Lys	Asn	Ile	Ser	Ser	Asp	Thr	Pro	Ala	Asn	Gly	Gly
					245				250				255		

Ser Asn Pro His Glu Ser Lys Asn Asn Gln Ser Glu Leu Ser Pro Thr
 260 265 270

 Glu Lys Gln Glu Val Gln Asn Lys Leu Ala Lys Leu Leu Ser Met Leu
 275 280 285

 Asp Glu Ile Asp Arg Arg Tyr Arg Gln Tyr Tyr His Gln Met Gln Ile
 290 295 300

 Val Val Ser Ser Phe Asp Val Val Ala Gly Glu Gly Ala Ala Lys Pro
 305 310 315 320

 Tyr Thr Ala Leu Ala Leu Gln Thr Ile Ser Arg His Phe Arg Cys Leu
 325 330 335

 Arg Asp Ala Ile Cys Asp Gln Ile Arg Ala Ser Arg Arg Ser Leu Gly
 340 345 350

 Glu Gln Asp Ala Ser Glu Asn Ser Lys Ala Ile Gly Ile Ser Arg Leu
 355 360 365

 Arg Phe Val Asp His His Ile Arg Gln Gln Arg Ala Leu Gln Gln Leu
 370 375 380

 Gly Met Met Gln Gln His Ala Trp Arg Pro Gln Arg Gly Leu Pro Glu
 385 390 395 400

 Ser Ser Val Ser Val Leu Arg Ala Trp Leu Phe Glu His Phe Leu His
 405 410 415

 Pro Tyr Pro Lys Asp Ser Asp Lys Ile Met Leu Ala Arg Gln Thr Gly
 420 425 430

 Leu Thr Arg Ser Gln Val Ser Asn Trp Phe Ile Asn Ala Arg Val Arg
 435 440 445

 Leu Trp Lys Pro Met Val Glu Glu Met Tyr Lys Glu Glu Ala Gly Asp
 450 455 460

 Ala Lys Ile Asp Ser Asn Ser Ser Asp Val Ala Pro Arg Leu Ala
 465 470 475 480

 Thr Lys Asp Ser Lys Val Glu Glu Arg Gly Glu Leu His Gln Asn Ala
 485 490 495

 Ala Ser Glu Phe Glu Gln Tyr Asn Ser Gly Gln Ile Leu Glu Ser Lys
 500 505 510

Ser Asn His Glu Ala Asp Val Glu Met Glu Gly Ala Ser Asn Ala Glu
515 520 525

Thr Gln Ser Gln Ser Gly Met Glu Asn Gln Thr Gly Glu Pro Leu Pro
530 535 540

Ala Met Asp Asn Cys Thr Leu Phe Gln Asp Ala Phe Val Gln Ser Asn
545 550 555 560

Asp Arg Phe Ser Glu Phe Gly Ser Phe Gly Ser Gly Asn Val Leu Pro
565 570 575

Asn Gly Val Ser Leu Thr Leu Gly Leu Gln Gln Gly Glu Gly Ser Asn
580 585 590

Leu Pro Met Ser Ile Glu Thr His Val Ser Tyr Val Pro Leu Arg Ala
595 600 605

Asp Asp Met Tyr Ser Thr Ala Pro Thr Thr Met Val Pro Glu Thr Ala
610 615 620

Glu Phe Asn Cys Leu Asp Ser Gly Asn Arg Gln Gln Pro Phe Trp Leu
625 630 635 640

Leu Pro Ser Ala Thr
645

<210> 15

<211> 7

<212> PRT

<213> Solanum tuberosum

<400> 15

Val Ser Leu Thr Leu Gly Leu
1 5

<210> 16

<211> 1383

<212> DNA

<213> Solanum tuberosum

<400> 16

gagtttctct ccctttaaa aaagaaaaaa aaaacacaac acccacttca aatatcaaac 60
aaatttctca ttgttattt tctaagtgtat ttacactact ttgttatttt gtttgtttt 120
tttagatat atatatggat gatgaaatgt atggtttca ttcaacaaga gacgattacg 180
cgatataaagc ttgtatgtca ccggagaatt tgatgtatgca aactgagttac aacaatttcc 240

acaactatac caactcgtcc atcttgactt ctaatccgat gatgttgga tccgatgata 300
ttcaattatc atcggAACaa actaattctt tcagttactat gactctcaa aataatgata 360
atatttatca aattagaagt ggaaattgtg gcggaggcag tggcagtgg ggttagcagta 420
aggatcataa tgataataac aataataatg aagattatga tgaagatgg tcaaattgtta 480
tcaaggctaa aatcgtctca catccttatt atctcaaatt actcaacgct tatattgatt 540
gccaaaaggt tggagcacca gcgggtatag taaatctgct ggaagaaaata aggcaacaaa 600
ctgattttcg taaaccaaac gctacttcta tatgtatagg agctgatcct gaacttgatg 660
agtttatgg aacgtattgt gatatattgt tgaagtataa gtccgatctg tctaggcct 720
ttgatgaagc aacaacgttc ctcaacaaga ttgaaatgca actaggtaat cttgcaaag 780
atgatgggg tgtatcatca gatgaggagt taagttgtgg tgaggcagat gcatcaatga 840
gaagtgagga taatgaactc aaagatagac tcctacgtaa gtttggaaagt catttaagta 900
gtctaaagtt ggaattttca aagaaaaaga agaaaggaa gctaccaaaa gaggcaaggc 960
aaatgttact tgcattgtgg gatgatcaact ttacccctacg gaggctgata 1020
agaattcaact agcagaatca acaggacttg atccaaagca gatcaacaat tggtttataa 1080
atcaaaggaa gagacattgg aaaccatcg agaatatgca gttagctgtt atggataatc 1140
taagctctca gttcttctca tcagatgatt gagtttgaat ggaaattgtg aaaatactgc 1200
tcttcatttc tcttttatt atatataata tataaatagt atattttgg gaaagaaaaga 1260
agttatttta ttaatcaaaa tctctataaa taatggtaga gattaattaa tgttgaattc 1320
ttcttgatca tgtaaatatt caatctagct aattgtcaaa attaatgctt acctaaaaaa 1380
aaa 1383

<210> 17

<211> 345

<212> PRT

<213> Solanum tuberosum

<400> 17

Met Asp Asp Glu Met Tyr Gly Phe His Ser Thr Arg Asp Asp Tyr Ala
1 5 10 15

Asp Lys Ala Leu Met Ser Pro Glu Asn Leu Met Met Gln Thr Glu Tyr
20 25 30

Asn Asn Phe His Asn Tyr Thr Asn Ser Ser Ile Leu Thr Ser Asn Pro
35 40 45

Met Met Phe Gly Ser Asp Asp Ile Gln Leu Ser Ser Glu Gln Thr Asn
50 55 60

Ser Phe Ser Thr Met Thr Leu Gln Asn Asn Asp Asn Ile Tyr Gln Ile
65 70 75 80

Arg Ser Gly Asn Cys Gly Gly Ser Gly Ser Gly Ser Ser Lys
85 90 95

Asp His Asn Asp Asn Asn Asn Asn Asn Glu Asp Tyr Asp Glu Asp Gly
100 105 110

Ser Asn Val Ile Lys Ala Lys Ile Val Ser His Pro Tyr Tyr Pro Lys
 115 120 125

 Leu Leu Asn Ala Tyr Ile Asp Cys Gln Lys Val Gly Ala Pro Ala Gly
 130 135 140

 Ile Val Asn Leu Leu Glu Glu Ile Arg Gln Gln Thr Asp Phe Arg Lys
 145 150 155 160

 Pro Asn Ala Thr Ser Ile Cys Ile Gly Ala Asp Pro Glu Leu Asp Glu
 165 170 175

 Phe Met Glu Thr Tyr Cys Asp Ile Leu Leu Lys Tyr Lys Ser Asp Leu
 180 185 190

 Ser Arg Pro Phe Asp Glu Ala Thr Thr Phe Leu Asn Lys Ile Glu Met
 195 200 205

 Gln Leu Gly Asn Leu Cys Lys Asp Asp Gly Gly Val Ser Ser Asp Glu
 210 215 220

 Glu Leu Ser Cys Gly Glu Ala Asp Ala Ser Met Arg Ser Glu Asp Asn
 225 230 235 240

 Glu Leu Lys Asp Arg Leu Leu Arg Lys Phe Gly Ser His Leu Ser Ser
 245 250 255

 Leu Lys Leu Glu Phe Ser Lys Lys Lys Lys Gly Lys Leu Pro Lys
 260 265 270

 Glu Ala Arg Gln Met Leu Leu Ala Trp Trp Asp Asp His Phe Arg Trp
 275 280 285

 Pro Tyr Pro Thr Glu Ala Asp Lys Asn Ser Leu Ala Glu Ser Thr Gly
 290 295 300

 Leu Asp Pro Lys Gln Ile Asn Asn Trp Phe Ile Asn Gln Arg Lys Arg
 305 310 315 320

 His Trp Lys Pro Ser Glu Asn Met Gln Leu Ala Val Met Asp Asn Leu
 325 330 335

 Ser Ser Gln Phe Phe Ser Ser Asp Asp
 340 345

<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 18
aagaagaaga agaaaaggaa

20

<210> 19
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 19
atgaaccagt tggat

17

<210> 20
<211> 10
<212> DNA
<213> Solanum tuberosum

<400> 20
ttgacttgac

10

<210> 21
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
ggatccttga agtggctctt ctct

24

<210> 22
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 22
aatcttagaga cactctcttt ttgcgt

25

<210> 23
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 23
ctattttgact tcacacgggtt attt

24

<210> 24
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 24
aaataaccgt gtgaagtcaa atag

24

<210> 25
<211> 8
<212> DNA
<213> Solanum tuberosum

<400> 25
tgacagst

8

<210> 26
<211> 9
<212> DNA
<213> Solanum tuberosum

<400> 26
tgacttgac

9

<210> 27
<211> 9
<212> DNA
<213> Solanum tuberosum

<400> 27
tgaswtgac

9

<210> 28
<211> 10
<212> DNA
<213> Solanum tuberosum

<400> 28
tgattgacag

10